

Report of Magnetical Observations at Falmouth Observatory for the Year 1896. Latitude $50^{\circ} 9' 0''$ N. and Longitude $5^{\circ} 4' 35''$ W.; height, 167 feet above mean sea-level.

These observations have been made by instruments purchased from the Government Grant Fund administered by the Royal Society.

Photographic curves of Magnetic Declination and of Horizontal Force variations have been regularly taken throughout the past year, with the exception of three days in December, and the magnets have worked satisfactorily throughout.

The results obtained from the Vertical Force Magnet are not sufficiently reliable for publication.

The scale values of the instruments were determined on 1st January, 1897. The following values of the ordinates of the photographic curves were then found:—

Declination, 1 cm. = $0^{\circ} 11' 7''$.

Bifilar, 1 cm. δ H. = 0.00050 C.G.S. unit.

The principal magnetic disturbances recorded during the year occurred on the following dates:—January 3, 4, 5, 31; February 2, 4, 28; March 4, 26, 27, 28; April 22, 23, 24; May 2, 3, 17, 18, 20; June 16; July 3, 4, 5; August 1, 2; September 18; October 11, 12; December 3, 4.

Observations with the Absolute Instruments have been made monthly, of which the following is a summary:—

Determinations of Horizontal Intensity, 34.

„ Inclination, 34 sets of four.

„ absolute Declination, 34.

Following the method adopted in the five previous years, it is intended that the observations be reduced, and that the Declination and Horizontal Force curves for five quiet days in each month of the year—selected by the Astronomer Royal—be tabulated and prepared for publication, in accordance with the International scheme. The results will be printed in the Royal Cornwall Polytechnic Society's Annual Report, and also in the 'Proceedings' of the Royal Society.

The following are the principal results of the magnetic elements for the year 1896:—

Mean Westerly Declination, $18^{\circ} 47' 5''$.

Mean Inclination, $67^{\circ} 5' 0''$.

Mean Horizontal Force, 0.18554 C.G.S. unit.

The Declination and Horizontal Force are deduced from hourly readings of the photographic curves, and so are corrected for the diurnal variation.

The Inclination is the mean of the absolute observations, the mean time of which is 3 P.M.

In Table V, X is the mean of the absolute values observed during the month (generally three in number), uncorrected for diurnal variations and for any disturbance. Y is the mean of the products of the Dips and X.

The results in the following tables, Nos. I, II, III, IV, are deduced from the magnetograph curves which have been standardised by observations of deflection and vibration. These were made with the Collimator Magnet marked 66A, and the Declinometer Magnet marked 66C in the Unifilar Magnetometer (No. 66) by Elliott Brothers, of London. Table No. V is deduced from these observations. The temperature correction (which is probably very small) has not been applied.

The Inclination was observed with the Inclinator by Dover, of Charlton, Kent, No. 86, and needles 1 and 2, which are $3\frac{1}{2}$ ins. in length, the results of which appear in Table VI.

The Declination and Horizontal Force values given in Tables I to IV are prepared in accordance with the suggestions made in the fifth report of the Committee of the British Association on comparing and reducing magnetic observations, and the time given is Greenwich mean time, which is 20 min. 18 sec. earlier than local time.

The following is a list of the days during the year 1896 which were selected by the Astronomer Royal, as suitable for the determination of the magnetic diurnal variations, and which have been employed in the preparation of the magnetic tables:—

January	1, 2, 21, 24, 29.
February	7, 18, 20, 23, 24.
March	11, 16, 17, 18, 21.
April.....	7, 14, 16, 20, 30.
May	5, 6, 9, 26, 29.
June	2, 7, 20, 23, 24.
July	2, 9, 17, 19, 31.
August.....	5, 13, 16, 27, 28.
September	8, 9, 10, 25, 28.
October.....	6, 7, 18, 25, 26.
November.....	3, 12, 22, 24, 25.
December.....	8, 12, 18, 19, 24.

The whole of the instruments have been maintained in good order. The Magnetic Hut in the garden has been painted inside and out, and the Magnetic Chamber thoroughly drained, to prevent the

recurrence of flooding during periods of excessive rainfall. The Photographic curves were suspended for four days in November owing to the presence of workmen in the chamber.

The Committee appointed by the British Association in 1895 to make a comparison of the Magnetic Standard Instruments in use at the several Magnetic Observatories in the Kingdom presented their Report at the Liverpool meeting of the Association, held August, 1896. Referring to Falmouth, the Committee, of whom Professor A. W. Rücker, M.A., F.R.S., was chairman, state *inter alia*:—"The work of the Falmouth Observatory is hampered by want of funds. The Vertical Force recording instrument has never worked properly, and appears to want extensive alterations. The Observations made by the Superintendent, Mr. E. Kitto, are of a very high order of excellence, and it is to be hoped that the Royal Cornwall Polytechnic Society, by which the Observatory was founded, will be able to ensure the maintenance of the Magnetic Observations under the best conditions."

EDWARD KITTO,

Magnetic Observer.

Table I.—Hourly Means of Declination at the Falmouth
on five selected quiet Days in

(18° + West.)

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Winter.												
1896.	/	/	/	/	/	/	/	/	/	/	/	/
*Jan. ..	49·0	49·4	49·6	49·6	50·2	50·2	50·0	49·7	49·2	48·7	49·5	51·1
Feb. ..	48·5	49·1	49·2	49·1	49·1	49·2	49·1	48·9	48·5	48·7	49·2	50·3
March ..	48·9	48·7	48·9	48·6	48·4	48·4	48·4	48·0	46·6	45·8	47·1	48·9
Oct. ..	43·5	43·5	43·7	43·6	43·6	43·5	43·4	42·6	42·0	41·9	43·6	46·0
†Nov. ...	42·9	42·9	43·3	43·5	43·9	43·7	43·0	43·0	42·7	41·9	42·9	44·1
Dec. ...	44·2	44·6	44·9	45·0	45·4	45·4	45·1	45·0	44·9	44·8	44·9	45·8
Means	46·2	46·4	46·6	46·6	46·8	46·7	46·5	46·2	45·7	45·3	46·2	47·7
Summer.												
April..	/	/	/	/	/	/	/	/	/	/	/	/
May ..	47·5	47·9	48·1	48·0	47·6	47·8	46·5	45·0	43·8	43·4	44·7	47·4
June ..	48·8	48·6	48·5	48·2	47·6	46·7	45·5	44·7	44·0	44·4	46·4	48·4
July ..	45·9	45·8	45·3	45·1	44·7	43·6	42·3	41·8	42·1	42·9	44·5	46·6
Aug. ...	47·5	47·4	47·2	47·1	46·6	45·7	44·5	43·7	43·8	44·4	46·5	48·6
Sept. ...	46·9	46·9	46·8	46·5	46·3	45·6	45·1	44·3	44·1	44·6	46·8	49·5
	45·1	45·2	45·2	44·9	44·8	44·2	43·5	42·6	41·3	42·0	45·0	48·2
Means	47·0	47·0	46·9	46·6	46·3	45·6	44·6	43·7	43·2	43·6	45·7	48·1

* Mean of four days, 1st, 21st, 24th, 29th.

† Mean of four days, 3rd, 22nd, 24th, 25th.

Table II.—Solar Diurnal Range of the Falmouth

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Summer mean.												
	/	/	/	/	/	/	/	/	/	/	/	/
	-0·7	-0·7	-0·8	-1·1	-1·4	-2·1	-3·1	-4·0	-4·5	-4·1	-2·0	+0·4
Winter mean.												
	/	/	/	/	/	/	/	/	/	/	/	/
	-1·1	-0·9	-0·7	-0·7	-0·5	-0·6	-0·8	-1·1	-1·6	-2·0	-1·1	+0·4
Annual mean.												
	/	/	/	/	/	/	/	/	/	/	/	/
	-0·9	-0·8	-0·8	-0·9	-1·0	-1·4	-2·0	-2·6	-3·1	-3·1	-1·6	+0·4

NOTE.—When the sign is + the magnet

Observatory determined from the Magnetograph Curves
each Month during the Year 1896.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
'	'	'	'	'	'	'	'	'	'	'	'	'
52.6	53.6	53.6	52.2	50.8	50.1	50.2	49.9	49.7	49.4	49.2	48.5	48.5
52.1	53.2	53.8	53.4	52.2	51.6	50.8	49.8	49.9	49.1	49.0	48.5	48.5
51.9	53.9	54.3	54.0	52.5	50.8	50.4	50.4	50.0	49.8	49.6	49.5	49.5
48.7	49.6	49.0	47.7	46.3	45.4	45.2	44.9	44.6	44.4	44.4	44.0	43.9
45.9	46.5	46.3	45.4	44.7	44.2	43.9	43.5	43.3	43.1	42.9	43.0	42.9
46.6	47.1	46.7	46.2	45.7	45.0	44.9	44.6	44.4	44.2	44.1	44.0	44.0
49.6	50.7	50.6	49.8	48.7	47.9	47.6	47.2	47.0	46.7	46.5	46.3	46.2
Summer.												
'	'	'	'	'	'	'	'	'	'	'	'	'
51.4	54.0	55.0	53.8	52.6	50.9	49.7	49.2	49.0	48.9	48.7	48.2	47.9
51.3	53.2	54.1	53.5	52.5	51.4	50.3	49.8	49.5	49.1	48.9	48.5	48.6
50.0	51.3	51.8	50.7	49.9	48.9	48.3	48.0	47.9	47.3	46.9	46.9	46.3
51.5	53.0	54.0	53.0	51.2	49.7	49.1	48.5	48.1	48.1	48.2	47.7	47.5
52.6	54.2	54.0	52.6	50.5	49.0	47.9	47.6	47.4	47.3	47.1	47.2	46.5
51.7	53.1	52.3	50.5	48.0	46.7	45.7	45.7	45.4	45.3	44.9	45.1	45.1
51.4	53.1	53.5	52.4	50.8	49.4	48.5	48.1	47.9	47.7	47.5	47.3	47.0

Declination as derived from Table I.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Summer mean.												
'	'	'	'	'	'	'	'	'	'	'	'	'
+3.7	+5.4	+5.8	+4.7	+3.1	+1.7	+0.8	+0.4	+0.2	0.0	-0.2	-0.4	-0.7
Winter mean.												
'	'	'	'	'	'	'	'	'	'	'	'	'
+2.3	+3.4	+3.3	+2.5	+1.4	+0.6	+0.3	-0.1	-0.3	-0.6	-0.8	-1.0	-1.1
Annual mean.												
'	'	'	'	'	'	'	'	'	'	'	'	'
+3.0	+4.4	+4.6	+3.6	+2.3	+1.2	+0.6	+0.2	-0.1	-0.3	-0.5	-0.7	-0.9

points to the west of its mean position.

Table III.—Hourly Means of the Horizontal Force at Falmouth
on five selected quiet Days in

0°18000 + (C.G.S. units.)

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Winter.												
1896.												
*Jan. ..	535	537	537	538	541	541	544	547	548	541	534	526
Feb. ..	536	534	534	533	536	539	541	541	541	533	526	519
March ..	550	551	551	551	551	553	553	552	546	535	526	528
Oct. ..	570	567	564	564	566	567	567	564	560	552	543	541
†Nov. ..	569	567	566	567	569	573	572	571	569	562	554	554
Dec. ..	561	562	562	561	562	565	567	567	567	565	560	559
Means	554	553	552	552	554	556	557	557	555	548	541	538
Summer.												
April ..	545	545	545	547	547	547	550	546	541	530	520	516
May ..	554	553	552	551	550	549	551	546	540	536	529	529
June ..	567	563	562	561	562	562	556	551	546	543	542	548
July ..	566	564	563	563	563	561	557	554	549	540	538	542
Aug. ..	564	562	561	559	557	556	554	550	541	531	527	530
Sept. ..	564	564	566	564	562	561	560	551	542	530	525	528
Means	560	559	558	558	557	556	555	550	543	535	530	532

* Mean of four days, 1st, 21st, 24th, 29th.

† Mean of four days, 3rd, 22nd, 24th, 25th.

(C.G.S. units.)

Table IV.—Diurnal Range of the Falmouth

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Summer mean.												
	+ '00004	+ '00003	+ '00002	+ '00002	+ '00001	'00000	— '00001	— '00006	— '00013	— '00021	— '00026	— '00024
Winter mean.												
	+ '00002	+ '00001	'00000	'00000	+ '00002	+ '00004	+ '00005	+ '00005	+ '00003	— '00004	— '00011	— '00014
Annual mean.												
	+ '00003	+ '00002	+ '00001	+ '00001	+ '00002	+ '00002	— '00001	— '00005	— '00013	— '00019	— '00019	

NOTE.—When the sign is + the

Observatory determined from the Magnetograph Curves,
each Month during the Year 1896.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
526	531	536	538	540	542	543	535	544	543	540	537	538
520	525	529	531	529	530	532	536	538	539	541	542	539
533	544	553	555	554	552	552	557	554	555	556	555	555
545	549	554	557	557	561	566	572	575	571	569	569	568
557	563	567	569	570	573	574	574	574	574	572	569	568
558	562	561	561	562	565	565	567	566	566	566	563	556
540	546	550	552	552	554	555	557	559	558	557	556	554
Summer.												
520	530	540	548	552	557	557	556	559	559	558	556	556
531	536	542	550	557	564	569	573	571	567	566	565	564
552	556	563	568	570	572	575	577	579	574	573	573	570
548	550	558	566	566	570	574	575	577	575	574	573	569
540	552	557	561	564	564	564	568	568	569	564	564	567
539	551	560	561	563	566	564	570	572	572	569	570	569
538	546	553	559	562	566	567	570	571	569	567	567	566

Horizontal Force as deduced from Table III.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Summer mean.												
- '00018	- '00010	- '00003	+ '00003	+ '00006	+ '00010	+ '00011	+ '00014	+ '00015	+ '00013	+ '00011	+ '00011	+ '00010
Winter mean.												
- '00012	- '00006	- '00002	- '00000	- '00000	+ '00002	+ '00003	+ '00005	+ '00007	+ '00006	+ '00005	+ '00004	+ '00002
Annual mean.												
- '00015	- '00008	- '00003	+ '00002	+ '00003	+ '00006	+ '00007	+ '00010	+ '00011	+ '00010	+ '00008	+ '00008	+ '00006

reading is above the mean.

Table V.—Magnetic Intensity. Falmouth Observatory, 1896.

1896.	C.G.S. measure.	
	X or Horizontal force.	Y or Vertical force.
January	0·18519	0·43748
February	0·18520	0·43775
March	0·18517	0·43722
April	0·18526	0·43814
May	0·18544	0·43907
June	0·18563	0·43934
July	0·18567	0·43904
August	0·18530	0·43867
September	0·18547	0·43903
October	0·18554	0·43920
November	0·18558	0·43887
December	0·18559	0·43928
Means	0·18542	0·43859

Table VI.—Observations of Magnetic Inclination.
Falmouth Observatory, 1896.

Month.		Mean.	Month.		Mean.
January	16.....	67 1'·4	July	10.....	67 5'·4
	23.....	67 3'·8		23.....	67 3'·7
	31.....	67 4'·9			67 4'·6
		67 3'·4	August	10.....	67 6'·1
February	8.....	67 4'·9		28.....	67 5'·9
	19.....	67 2'·7			67 6'·0
	27.....	67 3'·5			67 5'·6
		67 3'·7	September	5.....	67 5'·5
March	10.....	67 2'·5		9.....	67 6'·7
	21.....	67 2'·7		30.....	67 5'·9
	31.....	67 3'·3			67 7'·6
		67 2'·8	October	9.....	67 4'·2
April	9.....	67 2'·1		27.....	67 6'·0
	21.....	67 5'·8		30.....	67 5'·9
	30.....	67 6'·6			67 5'·3
		67 4'·8	November	11.....	67 4'·3
May	9.....	67 7'·1		24.....	67 4'·4
	20.....	67 5'·5		30.....	67 4'·7
	30.....	67 6'·0			67 6'·3
		67 6'·2	December	10.....	67 4'·5
June	10.....	67 7'·6		21.....	67 6'·6
	19.....	67 5'·4		29.....	67 5'·8
	29.....	67 4'·2			
		67 5'·7			